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Reply to the Editor:

I am in agreement with Drs Korst and Lee that there may be certain populations with nondysplastic Barrett's esophagus (BE) who may be at increased risk for esophageal cancer. There are currently no compelling data, however, to recommend any intervention beyond repeated surveillance endoscopy in patients with BE. The American Gastroenterological Association based its recommendation for surveillance on an estimated rate of progression of disease to high-grade dysplasia or adenocarcinoma of 0.5%. Recent large, population-based studies suggest that this risk estimate is actually too high. Hvid-Jensen and colleagues¹ reported in the *New England Journal of Medicine* in October 2011 an annual risk of progression to adenocarcinoma in patients with BE of 0.12%. This finding was based on analysis of a comprehensive database that included the entire population of Denmark. In a similar study of the entire population of Northern Ireland, Bhat and colleagues² reported a nearly identical absolute annual risk of 0.13%.

Current data indicate that the risk to the patient of malignant transformation from BE is even lower than previously thought, suggesting caution with invasive strategies that may in fact be over-treatment. There may be a role for radiofrequency ablation in selected—and currently undefined—subgroups of patients with nondysplastic BE.

Given the overall low cancer risk, the bar is set very high to prove cost-effectiveness, reduction in cancer progression, or reduction in mortality. I believe that radiofrequency ablation for nondysplastic BE is therefore difficult to justify, outside of a well-reasoned clinical trial.

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VENOVENOUS EXTRACORPOREAL MEMBRANE OXYGENATION IN ACUTE RESPIRATORY FAILURE: DO WE NEED A NEW CONFIGURATION?

To the Editor:

We read with great interest the article by Bonacchi and colleagues¹ in a recent issue of *The Journal of Thoracic and Cardiovascular Surgery*. Bonacchi and colleagues¹ presented their experience with the use of venovenous extracorporeal membrane oxygenation (ECMO) in 30 patients with severe acute respiratory failure and described their experience with the use of a customized arterial cannula to reduce the blood recirculation fraction (BRF) when high ECMO flows are needed to improve systemic oxygenation. In their "χ" configuration, a traditional inflow cannula is modified by making a 60° angle in its distal third to allow tip orientation toward the tricuspid valve. In their series, Bonacchi and colleagues¹ reported significant improvements in

oxygenation indices and a reduction of more than 20% in the BRF. Importantly, the study showed that the modified cannula can be used safely without mechanical complications.

The problem of recirculation with a double-lumen catheter for venovenous ECMO has been well studied in both animal and human models.²⁻⁴ In patients with acute respiratory failure who require high ECMO flow support, a low BRF is key to ensure adequate systemic oxygen delivery. The study by Bonacchi and colleagues¹ addresses this important issue and demonstrates that a low BRF is associated with successful venovenous ECMO in patients with respiratory distress. Although we recognize the efforts of Bonacchi and colleagues¹ to develop a new strategy to overcome the problem of BRF when high ECMO flows are needed, we would like to point out several important points that they failed to include in their report. First, a bicaval dual-lumen catheter that is already available in the United States (Avalon Elite; Avalon Laboratories LLC, Rancho Dominguez, Calif) can be safely and successfully used to provide adequate venovenous ECMO support in patients with acute respiratory failure.⁵ Second, the use of this dual-lumen Avalon Elite cannula offers the advantage of single-site cannulation, eliminates the need to use multiple catheters, and avoids the use femoral vascular access.⁵ Third, studies have shown that the use of the dual-lumen Avalon Elite cannula results in a very small BRF (as low as 2%).⁶ Finally, placement of the dual-lumen Avalon Elite cannula can be successfully achieved with fluoroscopic and a transthoracic echocardiographic guidance and does not require an invasive transesophageal approach.⁷

Although we applaud the efforts of Bonacchi and colleagues¹ and recognize the value of their technique in overcoming the problem of BRF, we believe that the use of the currently

available dual-lumen Avalon Elite cannula offers many advantages relative to their proposed new configuration and should be the preferred approach for patients with acute respiratory failure and for those being bridged to lung transplant. The use of the modified catheter and χ configuration of Bonacchi and colleagues¹ should be limited to patients who have no access to the currently available technology, such as the Avalon Elite dual-lumen catheter.

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Reply to the Editor:

Regarding the role of χ configuration at the dawning of adult bi-lumen cannula era for venovenous extracorporeal membrane oxygenation (ECMO), we read with interest the letter of Diaz-Guzman and colleagues from the University of Kentucky Transplant Center concerning our novel strategy for blood-oxygenation optimization in venovenous extracorporeal ECMO, which we call the " χ configuration." We appreciate all the useful comments received in response to the publication of our article.¹

The χ configuration strategy was born in early 2007, which was 2 years before the adult bicaval dual-lumen catheter (Avalon Elite; Avalon Laboratories, LLC, Rancho Dominguez, Calif) became clinically available (since January 15, 2009, in Europe).² The configuration was introduced to respond to some difficulties in adequate blood oxygenation with venovenous ECMO: achieving optimal oxygenation in all patients with severely impaired pulmonary functions (when high ECMO flows are needed to improve systemic oxygenation during protective ventilation to improve pulmonary recovery) and reducing the blood recirculation fraction to ensure adequate systemic oxygen delivery. The strategy was applied with a standard but customized cannula, and placement was successfully achieved with transthoracic or transesophageal echocardiographic guidance.

Since February 2009, we have used Avalon bilumen cannulas (to our knowledge, we are the first center in Europe and among the first in the world to do so). To date, we have treated more than 25 patients, with an ongoing research protocol to compare Avalon and χ configuration

performance. Indeed, the theoretic and physiologic concepts of the Avalon cannula and χ configuration basis are the same: to drain venous blood from both venae cavae and to reinfuse oxygenated blood directly through the tricuspid valve to reduce the blood recirculation fraction and to optimize blood oxygenation.

Furthermore, from our initial experience, the bilumen cannula presents various advantages that are correctly reported by Diaz-Guzman and colleagues; nevertheless, its limits and disadvantages were not presented. Intrinsically, the adult bilumen cannula presents some structural limitations and clinical restrictions.³⁻⁵ In contrast with Diaz-Guzman and colleagues, we think that an adequate and strict patient selection is necessary for appropriate use of this device to achieve optimal results.

From our initial experience we have identified some principal limitations of the adult Avalon bilumen cannula:

Maximal blood flow achieved: Also with a major dimension cannula (31 F) the limit in blood flow is 5 to 6 L/min.³⁻⁵ This value could be inadequate in different clinical scenarios, such as when pulmonary function is very impaired and patients require deep protective pulmonary ventilation.¹ In this situation, the complete extracorporeal blood oxygenation is necessary (venovenous ECMO blood flow >75% of cardiac output¹). The data in our hands seem to indicate that in these circumstances the flow generated from a 31F cannula could be insufficient, if a patient's body surface area is greater than 2.0 m² or body weight is greater than 80 kg (with our configuration, we have treated with no problems obese patients up to a body weight of 165 kg), especially if protective pulmonary ventilation is required. Similar considerations could be applied to smaller patients with hyperdynamic status (such as septic shock or fever). We have treated patients with cardiac outputs as great as 22 L/min.

Inflow and outflow pressure gradient: From our data (as yet unpublished)